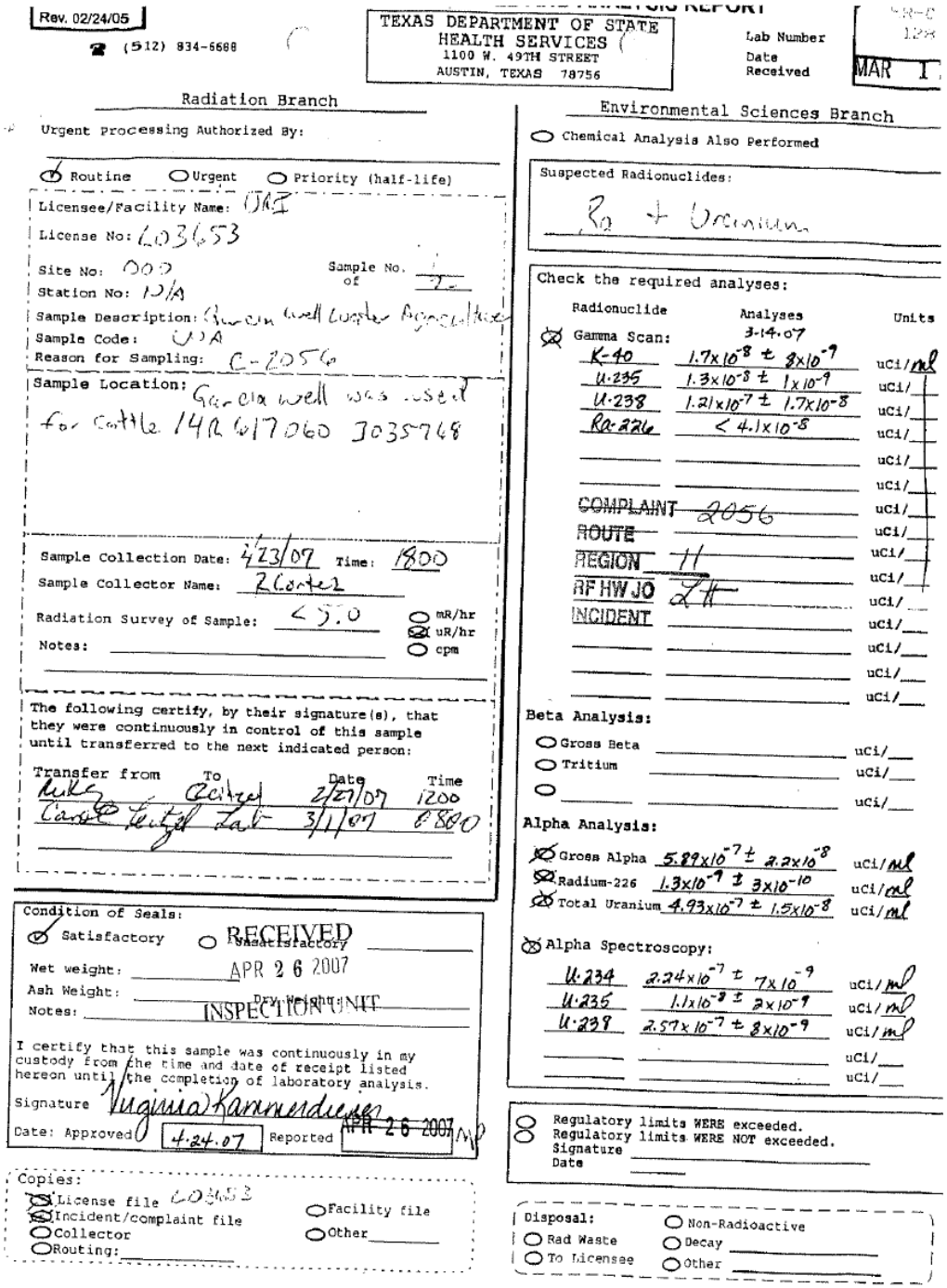
KINGSVILLE DOME URANIUM MINE AREA DATA AND ANALYSIS
(A Work in Progress)

Converting µCi/mL to µgm/L

June 23, 2013

EPA, Region 6
Dallas, Texas

José Eduardo Torres
Petroleum Engineer
Chemical Engineer



Rev. 02/24/05

(512) 834-6688

TEXAS DEPARTMENT OF STATE HEALTH SERVICES
1100 W. 49TH STREET
AUSTIN, TEXAS 78756

Lab Number
Date Received
MAR 1

Radiation Branch

Urgent Processing Authorized By:

☒ Routine ○ Urgent ○ Priority (half-life)

Licensee/Facility Name: ORI
License No: L03653
Site No: 002
Station No: N/A
Sample No. 1 of 1
Sample Description: Garcia well Custer Agriculture
Sample Code: UPA
Reason for Sampling: C-2056

Sample Location: Garcia well was used for cattle 14R 617060 3035748

Sample Collection Date: 4/23/07 Time: 1800
Sample Collector Name: R Carter
Radiation Survey of Sample: < 5.0 ○ mR/hr ☒ uR/hr ○ cpm
Notes:

The following certify, by their signature(s), that they were continuously in control of this sample until transferred to the next indicated person:

Transfer from	To	Date	Time
Mike	Carter	4/27/07	1200
Carter	Testing Lab	5/1/07	0800

Condition of Seals:
☒ Satisfactory ○ Unsatisfactory

Wet weight:
Ash Weight: Dry Weight:
Notes:

RECEIVED
APR 26 2007
INSPECTION UNIT

I certify that this sample was continuously in my custody from the time and date of receipt listed hereon until the completion of laboratory analysis.

Signature Virginia Kammerdiener

Date: Approved 4.24.07 Reported APR 26 2007 MP

Copies:
☒ License file 03653
☒ Incident/complaint file
○ Collector
○ Routing:
○ Facility file
○ Other

Environmental Sciences Branch

○ Chemical Analysis Also Performed

Suspected Radionuclides:
Ra + Uranium

Check the required analyses:

Radionuclide	Analyses 3-14-07	Units
☒ Gamma Scan:		
K-40	$1.7 \times 10^{-8} \pm 8 \times 10^{-9}$	uCi/ml
U-235	$1.3 \times 10^{-8} \pm 1 \times 10^{-9}$	uCi/ml
U-238	$1.21 \times 10^{-7} \pm 1.7 \times 10^{-8}$	uCi/ml
Ra-226	$< 4.1 \times 10^{-8}$	uCi/ml
COMPLAINT	2056	
ROUTE		
REGION	11	
RF HW JO	24	
INCIDENT		

Beta Analysis:
○ Gross Beta
○ Tritium
○

Alpha Analysis:
☒ Gross Alpha $5.89 \times 10^{-7} \pm 2.2 \times 10^{-8}$ uCi/ml
☒ Radium-226 $1.3 \times 10^{-9} \pm 3 \times 10^{-10}$ uCi/ml
☒ Total Uranium $4.93 \times 10^{-7} \pm 1.5 \times 10^{-8}$ uCi/ml

☒ Alpha Spectroscopy:

U-234	$2.24 \times 10^{-7} \pm 7 \times 10^{-9}$	uCi/ml
U-235	$1.1 \times 10^{-8} \pm 2 \times 10^{-9}$	uCi/ml
U-238	$2.57 \times 10^{-7} \pm 8 \times 10^{-9}$	uCi/ml

○ Regulatory limits WERE exceeded.
○ Regulatory limits WERE NOT exceeded.
Signature
Date

Disposal:
○ Rad Waste
○ To Licensee
○ Non-Radioactive
○ Decay
○ Other

Units Conversion: From µCi/mL to mg/L

4/23/07 Water Sample from Garcia Hill W-24

Gamma Scan of 03/14/07:
U235: 39 µg/L
U238: 360 µg/L

Alpha Spectroscopy :
U234: 666 µg/L
U235: 33 µg/L
U238: 765 µg/L
Natural U: 759 µg/L

Converting Radiochemistry Data To mg/L or µg/L:

Seconds/Year	3.1536E+07						
The Base for Natural Log: e:	2.71828183						
Disintegrations per Second per Curie: dps/Ci	3.70E+10						
Avogadro's Number (N):	6.02E+23						
Natural Log of 2	0.69314718						
Element:	**U-238**			**U-235**		Technetium-99	
Atomic Mass:	238.0289			235.04393		98.9	
Half-Life (Yrs):	4.47E+09			7.038E+08		2.13E+05	
Half-Life (Seconds):	1.41E+17			2.22E+16		6.72E+12	
Specific Activity (Conversion Factor):	1.24E+04	dps/g		8.00E+04	dps/g	6.28E+08	dps/g
	3.361E-07	Ci/g		2.162E-06	Ci/g	1.698E-02	Ci/g
	3.361E-10	Ci/mg		2.162E-09	Ci/mg	1.698E-05	Ci/mg
	3.361E-04	µCi/mg		2.162E-03	µCi/mg	1.698E+01	µCi/mg
	3.361E+02	pCi/mg		2.162E+03	pCi/mg	1.698E+07	pCi/mg
Reported Concentration (µCi/mL):	1.21E-07	µCi/mL		1.30E-08	µCi/mL		
	1.21E-04	µCi/L		1.30E-05	µCi/L		
Concentration (mg/L)	0.360	mg/L		0.039	mg/L		
Concentration (µg/L)	360	µg/L		39	µg/L		

Converting Radiochemistry Data To mg/L or µg/L:

Seconds/Year	3.1536E+07						
The Base for Natural Log: e:	2.71828183						
Disintegrations per Second per Curie: dps/Ci	3.70E+10						
Avogadro's Number (N):	6.02E+23						
Natural Log of 2	0.69314718						
Element:	**U-238**			**U-235**			**U-234**	
Atomic Mass:	238.0289			235.04393			234.041	
Half-Life (Yrs):	4.47E+09			7.038E+08			2.46E+05	
Half-Life (Seconds):	1.41E+17			2.22E+16			7.74E+12	
Specific Activity (Conversion Factor):	1.24E+04	dps/g		8.00E+04	dps/g		2.30E+08	dps/g
	3.361E-07	Ci/g		2.162E-06	Ci/g		6.224E-03	Ci/g
	3.361E-10	Ci/mg		2.162E-09	Ci/mg		6.224E-06	Ci/mg
	3.361E-04	µCi/mg		2.162E-03	µCi/mg		6.224E+00	µCi/mg
	3.361E+02	pCi/mg		2.162E+03	pCi/mg		6.224E+06	pCi/mg
Reported Concentration (µCi/mL):	2.57E-07	µCi/mL		1.10E-08	µCi/mL		2.24E-07	µCi/mL
	2.57E-04	µCi/L		1.10E-05	µCi/L		2.24E-04	µCi/L
Concentration (mg/L)	0.765	mg/L		0.033	mg/L		0.666	mg/L
Concentration (µg/L)	765	µg/L		33	µg/L		666	µg/L

Converting Radiochemistry Data To mg/L and µg/L:

Seconds/Year	3.1536E+07										
The Base for Natural Log: e:	2.718281828										
Disintegrations per Second per Curie: dps	3.70E+10										
Avogadro's Number (N):	6.02E+23										
Natural Log of 2	0.693147181										
Radionuclide:	**U-238**			**U-235**			**U-234**			**Natural U**	
Atomic Mass:	238.0289			235.04393			234.04095				
Half-Life (Yrs):	4.47E+09			7.038E+08			2.46E+05				
Half-Life (Seconds):	1.41E+17			2.22E+16			7.74E+12				
Isotopic Abundance:	0.992746			0.0072			0.000054			1.000000	
Specific Activity (Conversion Factor):	1.24E+04	dps/g		8.00E+04	dps/g		2.30E+08	dps/g			
	3.361E-07	Ci/g		2.162E-06	Ci/g		6.224E-03	Ci/g		6.853E-07	Ci/g
	3.361E-10	Ci/mg		2.162E-09	Ci/mg		6.224E-06	Ci/mg		6.853E-10	Ci/mg
	3.361E-04	µCi/mg		2.162E-03	µCi/mg		6.224E+00	µCi/mg		6.853E-04	µCi/mg
	3.361E+02	pCi/mg		2.162E+03	pCi/mg		6.224E+06	pCi/mg		6.853E+02	pCi/mg
ALPHA SPECTROSCOPY RESULTS for GH-W24 (03/14/07 Analysis):											
Reported Concentration (µCi/mL):	2.57E-07	µCi/mL		1.10E-08	µCi/mL		2.24E-07	µCi/mL			
	2.57E-04	µCi/L		1.10E-05	µCi/L		2.24E-04	µCi/L			
Concentration (mg/L)	0.765	mg/L		0.033	mg/L		0.666	mg/L		0.759	mg/L
Concentration (µg/L)	765	µg/L		33	µg/L		666	µg/L		759	µg/L